**IN THE CLAIMS:**

1. A confocal microscope lens arrangement, comprising:

a lens assembly housing including a lens assembly;

an exterior housing including a distal end and a proximal end, the exterior housing configured to allow the lens assembly housing to be placed therein, and translated between the proximal end and distal end of the exterior housing to focus the lens assembly; and

an immersion media filling the volume of area between the exterior housing and the lens assembly housing.

2. The confocal microscope lens arrangement of claim 1, wherein the exterior housing is dimensioned such that a clearance area is provided between the lens assembly housing and the exterior housing.

3. The confocal microscope lens arrangement of claim 2, wherein the clearance area is sized to allow a portion of the immersion media to flow from the distal end of the exterior housing to the proximal end of the exterior housing when the lens assembly is translationed toward the distal end of the exterior housing.

4. The confocal microscope lens arrangement of claim 2, wherein the clearance area is subject to allow a portion of the immersion media to flow from the proximal end of the exterior housing to the distal end of the exterior housing when the lens assembly is translationed away from the distal end of the exterior housing.

5. The confocal microscope lens arrangement of claim 1, wherein the distal end of the exterior housing has an aperture and a coverslip, and wherein the coverslip is placed in registration with the aperture.

6. The confocal microscope lens arrangement of claim 5, wherein the coverslip is composed of a transparent polymer with a refractive index of within five percent of 1.38.

7. The confocal microscope lens arrangement of claim 5, wherein the coverslip includes a first side and a second side, the first side being in contact with the immersion media, and the second side being coated with a polymer.

8. The confocal microscope lens arrangement of claim 7, wherein the polymer is transparent and has a refractive index of within five percent of 1.38.

9. The confocal microscope lens arrangement of claim 5, wherein the lens assembly housing includes a first end and a second end.

10. The confocal microscope lens arrangement of claim 9, wherein the lens assembly housing includes an aperture formed through the first end, and the lens assembly is in registration with the aperture in the second end of the lens assembly housing.

11. The confocal microscope lens arrangement of claim 10, wherein the lens assembly includes at least one lens.

12. The confocal microscope lens arrangement of claim 11, wherein the at least one lens of the lens assembly is in contact with the immersion media.

13. The confocal microscope lens arrangement of claim 12, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media, and the coverslip are within five percent of one another.

14. The confocal microscope lens arrangement of claim 12, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media, and the coverslip are within five percent of the index of 1.38.

15. The confocal microscope lens arrangement of claim 12, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media and the coverslip are approximately 1.38.

16. The confocal microscope lens arrangement of claim 11, wherein the at least one lens is composed of at least one of LASFN31, LASFN9, SF6, SF56,

AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

17. The confocal microscope lens arrangement of claim 5, wherein the coverslip is made of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

18. The confocal microscope lens arrangement of claim 12, wherein the at least one lens of the lens assembly is an aplanat lens.

19. The confocal microscope lens arrangement of claim 1, wherein the distal end of the exterior housing has an aperture and a window, and wherein the window is placed in registration with the aperture.

20. The confocal microscope lens arrangement of claim 1, wherein the lens assembly includes a first lens, a second lens, a third lens and a fourth lens.

21. The confocal microscope lens arrangement of claim 20, wherein the first lens is positioned in registration with an aperture formed in a distal end of the lens assembly housing.

22. The confocal microscope lens arrangement of claim 20, wherein the first lens is an aplanat lens.

23. The confocal microscope lens arrangement of claim 20, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, and having a curvature of approximately 0 and a semi-diameter of approximately 1.10, wherein the second surface of the first lens having a curvature of approximately 0.906, a semi-diameter of approximately 1.10, and wherein the center of the second surface of the first lens is approximately 1.240 mm from the center of the first surface of the first lens.

24. The confocal microscope lens arrangement of claim 23, wherein the second lens includes a first surface and a second surface, wherein the first surface of

the second lens having a curvature of approximately 0.00878 and a semi-diameter of approximately 1.80, wherein the second surface of the second lens having a curvature of approximately 0.208, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the second lens is approximately 0.968 mm from the center of the first surface of the second lens.

25. The confocal microscope lens arrangement of claim 24, wherein the center of the first surface of the second lens is approximately 0.0500 mm from the center of the second surface of the first lens.

26. The confocal microscope lens arrangement of claim 25, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately –0.00748 and a semi-diameter of approximately 2.05, wherein the second surface of the third lens having a curvature of approximately 0.0831, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the third lens is approximately 0.923 mm from the center of the first surface of the third lens.

27. The confocal microscope lens arrangement of claim 26, wherein the center of the first surface of the third lens is approximately 0.0500 mm from the center of the second surface the second lens.

28. The confocal microscope lens arrangement of claim 27, wherein the fourth lens is a compound lens.

29. The confocal microscope lens arrangement of claim 27, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately –0.0561 and a semi-diameter of approximately 2.11, wherein the second surface of the fourth lens having a curvature of approximately –0.340, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 4.020 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.122, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens

being approximately 2.230 mm from the center of the second surface of the fourth lens.

30. The confocal microscope lens arrangement of claim 29, wherein the center of the first surface of the fourth lens is approximately 0.050 mm from the center of the second surface the third lens.

31. The confocal microscope lens arrangement of claim 20, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, having a curvature of approximately 0 and a semi-diameter of approximately 0.783, wherein the second surface of the first lens having a curvature of approximately 0.901, a semi-diameter of approximately 1.10, wherein the center of the second surface of the first lens is approximately 1.26 mm from the center of the first surface of the first lens.

32. The confocal microscope lens arrangement of claim 31, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.0336 and a semi-diameter of approximately 1.71, wherein the second surface of the second lens having a curvature of 0.270, a semi-diameter of approximately 1.85, and wherein the center of the second surface of the second lens is approximately 0.881 mm from the center of the first surface of the second lens.

33. The confocal microscope lens arrangement of claim 32, wherein the center of the first surface of the second lens is approximately 0.05 mm from the center of the second surface of the first lens.

34. The confocal microscope lens arrangement of claim 33, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately 0.0186 and a semi-diameter of approximately 1.92, wherein the second surface of the third lens having a curvature of approximately 0.156, a semi-diameter of approximately 2.05, and wherein the center of the second surface of the third lens is approximately 1.77 mm from the center of the first surface of the third lens.

35. The confocal microscope lens arrangement of claim 34, wherein the center of the first surface of the third lens is approximately 0.05 mm from the center of the second surface the second lens.

36. The confocal microscope lens arrangement of claim 35, wherein the fourth lens is a compound lens.

37. The confocal microscope lens arrangement of claim 36, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately 0.0428 and a semi-diameter of approximately 2.01, wherein the second surface of the fourth lens having a curvature of approximately –0.355, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 3.73 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.0938, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens is approximately 1.84 mm from the center of the second surface of the fourth lens.

38. The confocal microscope lens arrangement of claim 37, wherein the center of the first surface of the fourth lens is approximately 0.05 mm from the center of the second surface the third lens.

39. The confocal microscope lens arrangement of claim 1, wherein the immersion medium is a fluid.

40. A microscope lens arrangement adapted to be used in-vivo comprising:

a lens assembly including at least one lens composed of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs wherein the lens assembly is sized to be used in a confocal lens arrangement.

41. The microscope lens arrangement of claim 40, further comprising a lens assembly housing having a first aperture provided in a distal end thereof, the lens assembly housing being dimensioned to accommodate the lens assembly, the lens

assembly being positioned such that the at least one lens of the plurality of lenses is in registration with the aperture formed in the distal end of the lens assembly.

42. The microscope lens arrangement of claim 41, further comprising an exterior housing having a second aperture formed through a distal end thereof, and enclosing the lens assembly housing therein.

43. The microscope lens arrangement of claim 42, further comprising a transparent lens which is positioned in registration with the second aperture.

44. The microscope lens arrangement of claim 42, further comprising a coverslip which is positioned in registration with the second aperture.

45. The microscope lens arrangement of claim 44, wherein the coverslip is composed of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

46. The microscope lens arrangement of claim 44, wherein the coverslip is composed of a transparent polymer with a refractive index of within five percent of 1.38.

47. The microscope lens arrangement of claim 44, wherein the exterior housing is dimensioned such that a clearance area is provided between the lens assembly housing and the exterior housing.

48. The microscope lens arrangement of claim 44, further comprising an immersion media filling the volume of area between the exterior housing and the lens assembly housing, the immersion media having a refractive index which is similar to that of the coverslip and of the at least one lens.

49. The microscope lens arrangement of claim 48, wherein the immersion medium is a fluid.

50. The microscope lens arrangement of claim 48, wherein the clearance area is sized to allow a portion of the immersion media to flow from the distal end of the exterior housing to a proximal end of the exterior housing when the lens assembly is translationed toward the distal end of the exterior housing.

51. The microscope lens arrangement of claim 50, wherein the clearance area is subject to allow a portion of the immersion media to flow from the proximal end of the exterior housing to the distal end of the exterior housing when the lens assembly is translationed away from the distal end of the exterior housing.

52. The microscope lens arrangement of claim 48, wherein the coverslip includes a first side and a second side, the first side being in contact with the immersion media, and the second side being coated with a polymer.

53. The microscope lens arrangement of claim 52, wherein the polymer is transparent and has a refractive index of within five percent of 1.38.

54. The microscope lens arrangement of claim 48, wherein respective refraction indexes of the at least one lens of the plurality of lenses of the lens assembly, the immersion media, and the coverslip are within five percent of one another.

55. The microscope lens arrangement of claim 48, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media, and the coverslip are within five percent of the index of 1.38.

56. The microscope lens arrangement of claim 48, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media and the coverslip are approximately 1.38.

57. The microscope lens arrangement of claim 40, wherein the lens assembly includes a first lens of the plurality of lenses and a second lens of the plurality of lenses, wherein the first lens of the plurality of lenses is an aplanat lens, wherein the second lens of the plurality of lenses assembly is a plano-convex lens,

wherein the first lens of the plurality of lenses is closer to a focal point of the lens assembly than the second lens of the plurality of lenses, wherein the first lens of the plurality of lenses is the closest lens of the plurality of lenses to the focal point of the lens assembly.

58. The microscope lens arrangement of claim 57, wherein the lens assembly includes a third lens and a fourth lens.

59. The microscope lens arrangement of claim 58, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, and having a curvature of approximately 0 and a semi-diameter of approximately 1.10, wherein the second surface of the first lens having a curvature of approximately 0.906, a semi-diameter of approximately 1.10, and wherein the center of the second surface of the first lens is approximately 1.240 mm from the center of the first surface of the first lens.

60. The microscope lens arrangement of claim 59, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.00878 and a semi-diameter of approximately 1.80, wherein the second surface of the second lens having a curvature of approximately 0.208, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the second lens is approximately 0.968 mm from the center of the first surface of the second lens.

61. The microscope lens arrangement of claim 60, wherein the center of the first surface of the second lens is approximately 0.0500 mm from the center of the second surface of the first lens.

62. The microscope lens arrangement of claim 61, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately –0.00748 and a semi-diameter of approximately 2.05, wherein the second surface of the third lens having a curvature of approximately 0.0831, a semi-diameter of approximately 2.30, and wherein the center of the second

surface of the third lens is approximately 0.923 mm from the center of the first surface of the third lens.

63. The microscope lens arrangement of claim 62, wherein the center of the first surface of the third lens is approximately 0.0500 mm from the center of the second surface the second lens.

64. The microscope lens arrangement of claim 63, wherein the fourth lens is a compound lens.

65. The microscope lens arrangement of claim 63, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately –0.0561 and a semi-diameter of approximately 2.11, wherein the second surface of the fourth lens having a curvature of approximately –0.340, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 4.020 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.122, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens being approximately 2.230 mm from the center of the second surface of the fourth lens.

66. The microscope lens arrangement of claim 65, wherein the center of the first surface of the fourth lens is approximately 0.050 mm from the center of the second surface the third lens.

67. The microscope lens arrangement of claim 60, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, having a curvature of approximately 0 and a semi-diameter of approximately 0.783, wherein the second surface of the first lens having a curvature of approximately 0.901, a semi-diameter of approximately 1.10, wherein the center of the second surface of the first lens is approximately 1.26 mm from the center of the first surface of the first lens.

68. The microscope lens arrangement of claim 67, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.0336 and a semi-diameter of approximately 1.71, wherein the second surface of the second lens having a curvature of 0.270, a semi-diameter of approximately 1.85, and wherein the center of the second surface of the second lens is approximately 0.881 mm from the center of the first surface of the second lens.

69. The microscope lens arrangement of claim 68, wherein the center of the first surface of the second lens is approximately 0.05 mm from the center of the second surface of the first lens.

70. The microscope lens arrangement of claim 69, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately 0.0186 and a semi-diameter of approximately 1.92, wherein the second surface of the third lens having a curvature of approximately 0.156, a semi-diameter of approximately 2.05, and wherein the center of the second surface of the third lens is approximately 1.77 mm from the center of the first surface of the third lens.

71. The microscope lens arrangement of claim 70, wherein the center of the first surface of the third lens is approximately 0.05 mm from the center of the second surface the second lens.

72. The microscope lens arrangement of claim 71, wherein the fourth lens is a compound lens.

73. The microscope lens arrangement of claim 71, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately 0.0428 and a semi-diameter of approximately 2.01, wherein the second surface of the fourth lens having a curvature of approximately –0.355, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 3.73 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a

curvature of approximately 0.0938, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens is approximately 1.84 mm from the center of the second surface of the fourth lens.

74. The microscope lens arrangement of claim 73, wherein the center of the first surface of the fourth lens is approximately 0.05 mm from the center of the second surface the third lens.

75. A confocal microscope lens arrangement comprising:

a lens assembly including at least one lens;

a lens assembly housing having a first aperture provided in a distal end thereof, the lens assembly housing being dimensioned to accommodate the lens assembly, the at least one lens of the lens assembly being in registration with the aperture formed in the distal end of the lens assembly housing;

an exterior housing having a second aperture formed through a distal end thereof, and enclosing the lens assembly housing therein;

a coverslip which is positioned in registration with the second aperture; and

an immersion media filling a volume of area between the exterior housing and the lens assembly housing, the immersion media having a refractive index which is similar to that of the coverslip and the at least one lens.

76. The confocal microscope lens arrangement of claim 75, wherein the exterior housing is dimensioned such that a clearance area is provided between the lens assembly housing and the exterior housing.

77. The confocal microscope lens arrangement of claim 76, wherein the clearance area is sized to allow a portion of the immersion media to flow from the distal end of the exterior housing to the proximal end of the exterior housing when the lens assembly is translationed toward the distal end of the exterior housing.

78. The confocal microscope lens arrangement of claim 76, wherein the clearance area is subject to allow a portion of the immersion media to flow from the proximal end of the exterior housing to the distal end of the exterior housing when the lens assembly is translationed away from the distal end of the exterior housing.

79. The confocal microscope lens arrangement of claim 75, wherein the coverslip is composed of a transparent polymer with a refractive index of within five percent of 1.38.

80. The confocal microscope lens arrangement of claim 75, wherein the coverslip includes a first side and a second side, the first side being in contact with the immersion media, and the second side being coated with a polymer.

81. The confocal microscope lens arrangement of claim 80, wherein the polymer is transparent and has a refractive index of within five percent of 1.38.

82. The confocal microscope lens arrangement of claim 75, wherein the lens assembly housing includes a first end and a second end.

83. The confocal microscope lens arrangement of claim 75, wherein the at least one lens of the lens assembly is in contact with the immersion media.

84. The confocal microscope lens arrangement of claim 83, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media, and the coverslip are within five percent of one another.

85. The confocal microscope lens arrangement of claim 83, wherein respective refraction indexes of the at least one lens, the immersion media, and the coverslip are within five percent of the index of 1.38.

86. The confocal microscope lens arrangement of claim 83, wherein respective refraction indexes of the at least one lens of the lens assembly, the immersion media and the coverslip are approximately 1.38.

87. The confocal microscope lens arrangement of claim 75, wherein the at least one lens is composed of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

88. The confocal microscope lens arrangement of claim 75, wherein the coverslip is made of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

89. The confocal microscope lens arrangement of claim 75, wherein the at least one lens of the lens assembly is an aplanat lens.

90. The confocal microscope lens arrangement of claim 75, wherein the lens assembly includes a first lens, a second lens, a third lens and a fourth lens.

91. The confocal microscope lens arrangement of claim 90, wherein the first lens is an aplanat lens, and wherein the second lens is a plano-convex lens.

92. The confocal microscope lens arrangement of claim 90, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, and having a curvature of approximately 0 and a semi-diameter of approximately 1.10, wherein the second surface of the first lens having a curvature of approximately 0.906, a semi-diameter of approximately 1.10, and wherein the center of the second surface of the first lens is approximately 1.240 mm from the center of the first surface of the first lens.

93. The confocal microscope lens arrangement of claim 92, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.00878 and a semi-diameter of approximately 1.80, wherein the second surface of the second lens having a curvature of approximately 0.208, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the second lens is approximately 0.968 mm from the center of the first surface of the second lens.

94. The confocal microscope lens arrangement of claim 93, wherein the center of the first surface of the second lens is approximately 0.0500 mm from the center of the second surface of the first lens.

95. The confocal microscope lens arrangement of claim 94, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately –0.00748 and a semi-diameter of approximately 2.05, wherein the second surface of the third lens having a curvature of approximately 0.0831, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the third lens is approximately 0.923 mm from the center of the first surface of the third lens.

96. The confocal microscope lens arrangement of claim 95, wherein the center of the first surface of the third lens is approximately 0.0500 mm from the center of the second surface the second lens.

97. The confocal microscope lens arrangement of claim 96, wherein the fourth lens is a compound lens.

98. The confocal microscope lens arrangement of claim 96, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately –0.0561 and a semi-diameter of approximately 2.11, wherein the second surface of the fourth lens having a curvature of approximately –0.340, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 4.020 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.122, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens being approximately 2.230 mm from the center of the second surface of the fourth lens.

99. The confocal microscope lens arrangement of claim 98, wherein the center of the first surface of the fourth lens is approximately 0.050 mm from the center of the second surface the third lens.

100. The confocal microscope lens arrangement of claim 90, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, having a curvature of approximately 0 and a semi-diameter of approximately 0.783, wherein the second surface of the first lens having a curvature of approximately 0.901, a semi-diameter of approximately 1.10, wherein the center of the second surface of the first lens is approximately 1.26 mm from the center of the first surface of the first lens.

101. The confocal microscope lens arrangement of claim 100, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.0336 and a semi-diameter of approximately 1.71, wherein the second surface of the second lens having a curvature of 0.270, a semi-diameter of approximately 1.85, and wherein the center of the second surface of the second lens is approximately 0.881 mm from the center of the first surface of the second lens.

102. The confocal microscope lens arrangement of claim 101, wherein the center of the first surface of the second lens is approximately 0.05 mm from the center of the second surface of the first lens.

103. The confocal microscope lens arrangement of claim 102, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately 0.0186 and a semi-diameter of approximately 1.92, wherein the second surface of the third lens having a curvature of approximately 0.156, a semi-diameter of approximately 2.05, and wherein the center of the second surface of the third lens is approximately 1.77 mm from the center of the first surface of the third lens.

104. The confocal microscope lens arrangement of claim 103, wherein the center of the first surface of the third lens is approximately 0.05 mm from the center of the second surface the second lens.

105. The confocal microscope lens arrangement of claim 104, wherein the fourth lens is a compound lens.

106. The confocal microscope lens arrangement of claim 104, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately 0.0428 and a semi-diameter of approximately 2.01, wherein the second surface of the fourth lens having a curvature of approximately –0.355, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 3.73 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.0938, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens is approximately 1.84 mm from the center of the second surface of the fourth lens.

107. The confocal microscope lens arrangement of claim 106, wherein the center of the first surface of the fourth lens is approximately 0.05 mm from the center of the second surface the third lens.

108. The confocal microscope lens arrangement of claim 75, wherein the immersion medium is a fluid.

109. A confocal microscope lens arrangement comprising:

a lens assembly including a plurality of lenses, wherein a first lens of the plurality of lenses is an aplanat lens, wherein a second lens of the plurality of lenses is a plano-convex lens, wherein the first lens of the plurality of lenses is closer to a focal point of the lens assembly than the second lens of the plurality of lenses, and wherein the first lens of the plurality of lenses is the closest lens of the plurality of lenses to the focal point of the lens assembly.

110. The confocal microscope lens arrangement of claim 109, further comprising a lens assembly housing having a first aperture provided in a distal end thereof, the lens assembly housing being dimensioned to accommodate the lens assembly, the lens assembly being positioned such that the first lens of the plurality of lenses is in registration with the aperture formed in the distal end of the lens assembly.

111. The confocal microscope lens arrangement of claim 110, further comprising an exterior housing having a second aperture formed through a distal end thereof, and enclosing the lens assembly housing therein.

112. The confocal microscope lens arrangement of claim 111, further comprising a window which is positioned in registration with the second aperture.

113. The confocal microscope lens arrangement of claim 111, further comprising a coverslip which is positioned in registration with the second aperture.

114. The confocal microscope lens arrangement of claim 113, wherein the coverslip is composed of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

115. The confocal microscope lens arrangement of claim 113, wherein the coverslip is composed of a transparent polymer with a refractive index of within five percent of 1.38.

116. The confocal microscope lens arrangement of claim 113, wherein the exterior housing is dimensioned such that a clearance area is provided between the lens assembly housing and the exterior housing.

117. The confocal microscope lens arrangement of claim 116, further comprising an immersion media filling a volume of area between the exterior housing and the lens assembly housing, the immersion media having a refractive index which is similar to that of the coverslip and the first lens of the plurality of lenses of the lens assembly.

118. The confocal microscope lens arrangement of claim 117, wherein the immersion medium is a fluid.

119. The confocal microscope lens arrangement of claim 117, wherein the clearance area is sized to allow a portion of the immersion media to flow from the

distal end of the exterior housing to the proximal end of the exterior housing when the lens assembly is translationed toward the distal end of the exterior housing.

120. The confocal microscope lens arrangement of claim 117, wherein the clearance area is subject to allow a portion of the immersion media to flow from a proximal end of the exterior housing to the distal end of the exterior housing when the lens assembly is translationed away from the distal end of the exterior housing.

121. The confocal microscope lens arrangement of claim 117, wherein the coverslip includes a first side and a second side, the first side being in contact with the immersion media, and the second side being coated with a polymer.

122. The confocal microscope lens arrangement of claim 121, wherein the polymer is transparent and has a refractive index of within five percent of 1.38.

123. The confocal microscope lens arrangement of claim 117, wherein respective refraction indexes of the first lens of the plurality of lenses of the lens assembly, the immersion media, and the coverslip are within five percent of one another.

124. The confocal microscope lens arrangement of claim 117, wherein respective refraction indexes of the first lens of the lens assembly, the immersion media, and the coverslip are within five percent of the index of 1.38.

125. The confocal microscope lens arrangement of claim 117, wherein respective refraction indexes of the first lens of the lens assembly, the immersion media and the coverslip are approximately 1.38.

126. The confocal microscope lens arrangement of claim 109, wherein the first lens of the lens assembly is composed of at least one of LASFN31, LASFN9, SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

127. The confocal microscope lens arrangement of claim 109, wherein the second lens of the lens assembly is composed of at least one of LASFN31, LASFN9,

SF6, SF56, AMTIR1, AMTIR2, AMTIR3, Silicon, Germanium, Sapphire, ZnSe, ZnS, Cleartran, ZnSe CVD, and GaAs.

128. The confocal microscope lens arrangement of claim 109, wherein the lens assembly includes a third lens and a fourth lens.

129. The confocal microscope lens arrangement of claim 128, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, and having a curvature of approximately 0 and a semi-diameter of approximately 1.10, wherein the second surface of the first lens having a curvature of approximately 0.906, a semi-diameter of approximately 1.10, and wherein the center of the second surface of the first lens is approximately 1.240 mm from the center of the first surface of the first lens.

130. The confocal microscope lens arrangement of claim 129, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.00878 and a semi-diameter of approximately 1.80, wherein the second surface of the second lens having a curvature of approximately 0.208, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the second lens is approximately 0.968 mm from the center of the first surface of the second lens.

131. The confocal microscope lens arrangement of claim 130, wherein the center of the first surface of the second lens is approximately 0.0500 mm from the center of the second surface of the first lens.

132. The confocal microscope lens arrangement of claim 131, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately –0.00748 and a semi-diameter of approximately 2.05, wherein the second surface of the third lens having a curvature of approximately 0.0831, a semi-diameter of approximately 2.30, and wherein the center of the second surface of the third lens is approximately 0.923 mm from the center of the first surface of the third lens.

133. The confocal microscope lens arrangement of claim 132, wherein the center of the first surface of the third lens is approximately 0.0500 mm from the center of the second surface the second lens.

134. The confocal microscope lens arrangement of claim 133, wherein the fourth lens is a compound lens.

135. The confocal microscope lens arrangement of claim 133, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately –0.0561 and a semi-diameter of approximately 2.11, wherein the second surface of the fourth lens having a curvature of approximately –0.340, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 4.020 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.122, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens being approximately 2.230 mm from the center of the second surface of the fourth lens.

136. The confocal microscope lens arrangement of claim 135, wherein the center of the first surface of the fourth lens is approximately 0.050 mm from the center of the second surface the third lens.

137. The confocal microscope lens arrangement of claim 128, wherein the first lens includes a first surface and a second surface, wherein the first surface of the first lens being in contact with the immersion media, having a curvature of approximately 0 and a semi-diameter of approximately 0.783, wherein the second surface of the first lens having a curvature of approximately 0.901, a semi-diameter of approximately 1.10, wherein the center of the second surface of the first lens is approximately 1.26 mm from the center of the first surface of the first lens.

138. The confocal microscope lens arrangement of claim 137, wherein the second lens includes a first surface and a second surface, wherein the first surface of the second lens having a curvature of approximately 0.0336 and a semi-diameter of

approximately 1.71, wherein the second surface of the second lens having a curvature of 0.270, a semi-diameter of approximately 1.85, and wherein the center of the second surface of the second lens is approximately 0.881 mm from the center of the first surface of the second lens.

139. The confocal microscope lens arrangement of claim 138, wherein the center of the first surface of the second lens is approximately 0.05 mm from the center of the second surface of the first lens.

140. The confocal microscope lens arrangement of claim 139, wherein the third lens includes a first surface and a second surface, wherein the first surface of the third lens having a curvature of approximately 0.0186 and a semi-diameter of approximately 1.92, wherein the second surface of the third lens having a curvature of approximately 0.156, a semi-diameter of approximately 2.05, and wherein the center of the second surface of the third lens is approximately 1.77 mm from the center of the first surface of the third lens.

141. The confocal microscope lens arrangement of claim 140, wherein the center of the first surface of the third lens is approximately 0.05 mm from the center of the second surface the second lens.

142. The confocal microscope lens arrangement of claim 141, wherein the fourth lens is a compound lens.

143. The confocal microscope lens arrangement of claim 141, wherein the fourth lens includes a first surface, a second surface, and a third surface, wherein the first surface of the fourth lens having a curvature of approximately 0.0428 and a semi-diameter of approximately 2.01, wherein the second surface of the fourth lens having a curvature of approximately –0.355, a semi-diameter of approximately 2.30, wherein the center of the second surface of the fourth lens is approximately 3.73 mm from the center of the first surface of the fourth lens, wherein the third surface of the fourth lens having a curvature of approximately 0.0938, a semi-diameter of approximately 2.30, and wherein the center of the third surface of the fourth lens is approximately 1.84 mm from the center of the second surface of the fourth lens.

144. The confocal microscope lens arrangement of claim 143, wherein the center of the first surface of the fourth lens is approximately 0.05 mm from the center of the second surface the third lens.

145. The confocal microscope lens arrangement of claim 109, wherein the first lens of the plurality of lenses is adjacent to the second lens of the plurality of lenses.